

REVIEW

By

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Of Scientific Works Presented

By Associate Professor Veselin Nenkov Nenkov, PhD,
In Relation with Participation in a Contest for Occupying the Academic
Position of "Professor" at „Nikola Vaptsarov“ Naval Academy
Under Higher Education Area: 1. Pedagogical Sciences,
Professional Field: 1.3. Pedagogy of Teaching
Mathematics and Informatics
(Geometry)

Announced in State Gazette Issue № 91 of 19.11.2019

With order № JIC 5 of 15.01.2020 of the Chief of „Nikola Vaptsarov“ Naval Academy I have been appointed as a member of the scientific jury and a reviewer in a contest for occupying the academic position of **“professor”** at „Nikola Vaptsarov“ Naval Academy under higher education area: 1. Pedagogical Sciences, Professional Field: 1.3. Pedagogy of Teaching Mathematics and Informatics (Geometry) announced for the needs of the Department of “Mathematics and Physics”.

Only one candidate has submitted documents for participation in the contest announced: associate professor Veselin Nenkov Nenkov, PhD „Nikola Vaptsarov“ Naval Academy.

1. Summary of the presented materials

The set of materials submitted by associate professor Veselin Nenkov Nenkov, PhD in electronic form complies with the Regulations on the Academic Staff Development of Naval Academy and includes the following documents:

- CV in EU format;
- diploma for PhD educational and scientific degree;
- certificate for acquiring the academic position “associate professor”;

- reference on complying with the minimum national requirements „PhD”;
- reference on complying with the minimum national requirements “professor”;
- list of scientific works and their copies and annotations;
- work record certificate;
- other documents.

2. Brief biographical information about the candidate

Veselin Nenkov Nenkov was born in Troyan on 21th, March, 1964. In 1989 he graduated from PU “Paisii Hilendarski” with Master specialty “Mathematics and Computer Sciences”. In 1992 – 1993 he did two postgraduate qualification courses and was awarded second qualification degree. In 2011 he did a PhD programme Methodology of Teaching Mathematics for acquiring the educational degree “doctor”.

From 1989 to 1995 Nenkov worked as Mathematics teacher. He started his career at Technical College Lovech in 1995 and since then has been gradually promoted to assistant, chief assistant professor and associate professor. He is an associate professor in Naval Academy since 2017.

3. Summary characteristic of candidate’s activities

Assessment of the candidate’s scientific- research activity

The candidate submitted 22 scientific papers – 1 monograph and 21 research paper, 3 scientific articles in English. Six of the articles have been published in international and national conferences, the rest in prestigious journals. 16 articles are in the journal Mathematics and Informatics, which is referred by Web of Science since 2017. All papers submitted for review are accepted for review.

The scientific works submitted by the candidate mainly concern methodological problems, focused on the research approaches in geometry training.

As the candidate himself has suggested the presented content and ideas in the submitted scientific production can be classified and main contributions can be summarized as follows:

- Scientific Research:
 - A number of new mathematical statements have been discovered and proved: summaries of classical theorems in triangle geometry; new proof of Poncelet's quadrilateral theorem; new geometric locations of remarkable points in the quadrilateral generated by the Poncelet theorem; new remarkable points, straight lines and curves in the triangle plane, and generalizations of such points; summarizing isogonal and iso-isomic images in the triangle plane; a complete description of the plurality of centers of conical sections described and inscribed in a quadrilateral; the discovery of a remarkable sphere in the orthocentric tetrahedron; description of a special class of hyperbolic curves in the plane of the quadrilateral (3.1; 3.2).
 - The theory of linear programming for areas enclosed by curves and surfaces of the second degree (2.1.3) is developed.
- Scientific and Applied Research
 - A methodology has been developed for teaching and learning the topic “Second-degree curves” (1.1.1).
 - Some assertions and images have been explored in terms of the ability of the GSP to serve as a heuristic means of rediscovery and generalization by analogy (2.2.13; 2.2.14; 2.2.16; 2.2.18).
 - The GSP is applied to discover a number of new mathematical statements that are rigorously proved by various geometric and analytical means (2.2.1; 2.2.2; 2.2.6; 2.2.10; 2.2.12; 2.2.17; 2.2.19).
 - A methodology for applying the bar-centric coordinates in the study and proving of geometric assertions has been developed (2.2.11; 3.1; 3.2).
 - A methodology for applying complex numbers in the study and proving of geometric claims has been developed (2.2.16; 3.2).
 - A number of concepts and theorems of the triangle geometry and other figures are summarized (2.1.1; 2.1.5; 2.1.6; 2.2.9; 2.2.3; 2.2.4; 2.2.5; 2.2.7; 2.2.8).

- The geometric positions of the roots of the derivatives of some types of polynomials are determined (2.2.21). Some relationships were found between faces of sections and walls in some polyhedral walls (2.2.15).
- Applied Research
- A methodology for searching and finding generalizations in geometries has been developed (1.1.1; 2.2.13; 2.2.14).
 - A GSP toolkit has been proposed for working with second-degree curves (1.1.1), isogonal, isotomic and other correlations in GSP (1.1.1; 2.1.5; 2.2. 13; 2.2.14), constructing landmarks, lines and curves related to different geometric shapes (1.1.1).
 - A methodology for searching and finding generalizations in geometries has been developed (1.1.1; 2.2.13; 2.2.14).
 - A general idea has been developed to establish the dependencies between the radii of tangent circles in the plane of a triangle (2.2.6).

The submitted scientific works can be useful for university students, school teachers and university professors who work with talented students.

We will note Veselin Nenkov's monograph "Enhancing Mathematical Competences with Dynamic Geometry" with a volume of 316 pages, published in 2020 in the publishing house "Archimedes". It presents the author's long standing work in a synthesized and easy-to-use format for teaching talented students. The monograph offers many tasks and examples. Each chapter has formulated conclusions and comments that are of high methodological value.

The candidate has provided a detailed reference for his / her quotations, with 12 being included in the materials of the competition. The noted citations are from Bulgarian and foreign authors and are in collections of pedagogical conferences and journal articles. According to Web of Science, Associate Professor Veselin Nenkov has a Hirsch 5 index.

The quantity of the presented materials complies with and even exceeds the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

Assessment of the candidate's pedagogical and educational activity

Associate professor Veselin Nenkov, PhD has an over 30-year-long professional experience. He has been reading lectures, tutorials and laboratory classes in disciplines such as: "Geometry", "Mathematics" – I, II, III, etc.

Prof. Nenkov's interests are in the field of inquiry-based learning in mathematics. He actively applies the capabilities of dynamic mathematical software in the discovery of new theorems. For the needs of his courses, Assoc. Prof. Nenkov has published a monograph and numerous methodological developments which he applies in the course of the course.

4. Assessment of the candidate's personal contribution

Undoubtedly the presented scientific work is original and authentic and the co-written works have a clearly differentiated contribution.

5. Critical remarks and recommendations

The scientific production submitted for participation in the contest does not contain noticeable imperfections that can minimize its value.

6. Personal impression

I know associate professor Veselin Nenkov, PhD as an acknowledged professional in her field ready to help and share her expertise with colleagues.

CONCLUSION

The documents and materials presented by associate professor Veselin Nenkov, PhD comply with all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its implementation, and the respective „Nikola Vaptsarov“ Naval Academy.

The candidate in the contest has presented a significant number of scientific materials, published after the materials used for the PhD educational-scientific degree defense and the contest for acquiring the academic position of 'associate professor'. The candidate's work contains original scientific and applied contributions that have been granted recognition and a considerable part of them are published in scientific journals and editions by national and international academic publishers. Most of results are published in journals referred by Web of Science. The scientific and lecturer qualification of associate professor Veselin Nenkov, PhD is undeniable.

The candidate **complies with** the minimum national requirements for occupying the academic position of “professor’ in Professional Field 1.3.

I have no doubts for plagiarism in the submitted scientific work.

After reviewing the materials and scientific works presented for the contest and analyzing their significance and the scientific, scientific-applied and applied contributions they contain I find it justified to give my positive assessment and to recommend to the Scientific Jury to prepare a report-proposal The Faculty Council of the Faculty of Engineering at „Nikola Vaptsarov“ Naval Academy to appoint associate professor Veselin Nenkov Nenkov, PhD to the academic position “**professor**” at „Nikola Vaptsarov“ Naval Academy under Professional Field 1.3. Pedagogy of Teaching Mathematics and Informatics (Geometry).

11.03.2020

Reviewer:
/Prof. DSc. Nataliya Pavlova/